ENVIRONMENTAL OUTCOME – Grassland Bypass Project

Regions: Grassland Basin and Lower San Joaquin River

Sampling Period: 1995 through June 2011

Project Objectives: **Decreased selenium concentration and loads in the Wetland Channels and San Joaquin River**

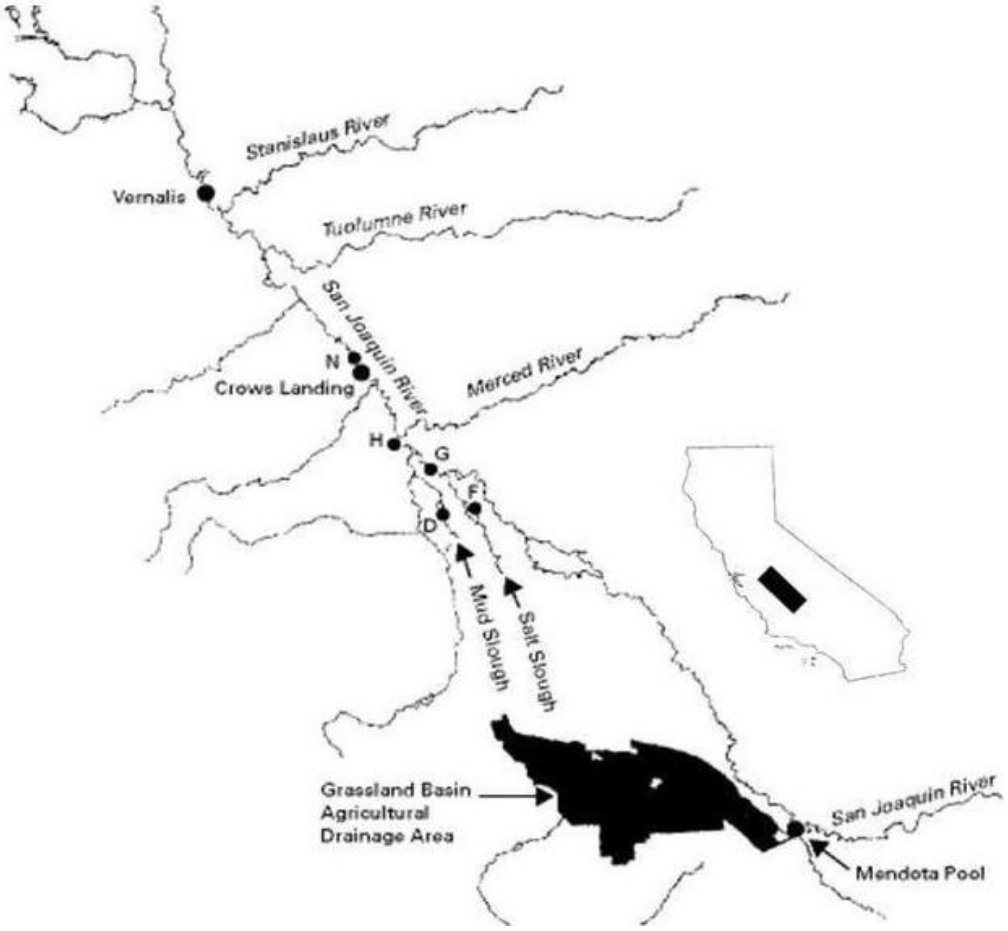
MESSAGE: **The Project improves water quality in 93 miles of wetland channels and the San Joaquin River, sustains the productivity of 97,000 acres of farmland, and fosters cooperation between area farmers and regulatory agencies in drainage management reduction of selenium and salt loading.**

KEY STATS- Water Quality

Size of Grasslands Bypass Project Area	*97,000 Acres*
Number of sites sampled	*17*
Number if Constituents Measured	*14*
Number of Agencies Involved	*13*
Sampling Frequency	*Weekly Grab Samples Daily Composite Samples*
Reduction of Se load since 1996	*61%*
Number of Wet Years	*10*
Number of Dry Years	*14*

Site Locations:

Seventeen sites along the San Joaquin River, Wetland Channels, Drainage Canals, and within Kesterson Wildlife Refuge were monitored daily to weekly for Se, B, pH, DO, temperature and SC. Nutrients, Mo, and bacteria are monitored monthly at selected sites. Water quality monitoring was conducted by the Central Valley Regional Water Quality Control Board and the Grassland Area Farmers. Other agencies monitored additional parameters to evaluate project performance.



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WHAT IS THE MEASURE SHOWING?

The data collected throughout this project provides information on the reduction of selenium, salt, and boron discharge (both concentrations and total loads) into the San Joaquin River and Grassland Area Wetland Channels.

Figure 1 shows the decrease in the selenium load in the San Joaquin River since monitoring began in 1986. Figure 2 shows the decrease in selenium concentrations in the wetland water supply channel Camp 13.

Figure 1. Se Load in San Joaquin River at Crows Landing

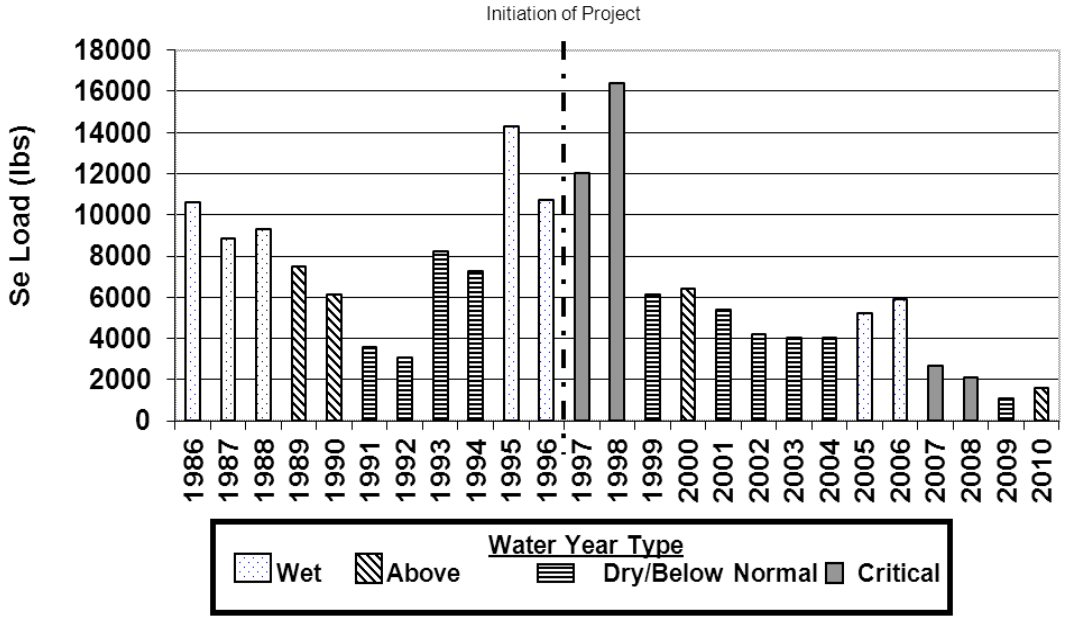
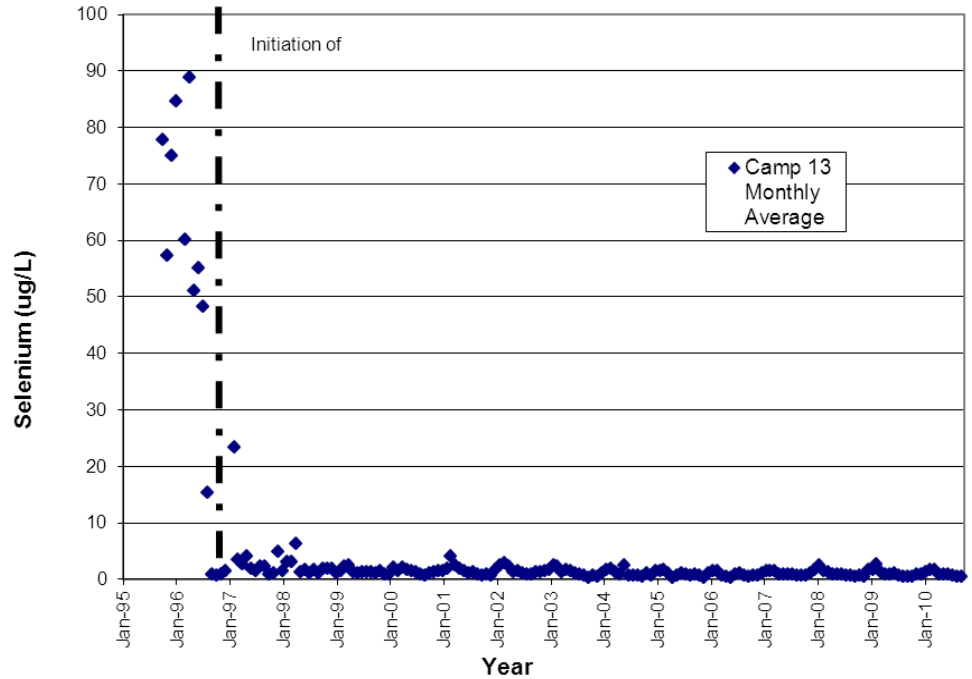


Figure 2. Selenium in a Wetland Supply Channel



WHY THIS INFORMATION IS IMPORTANT?

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Elevated selenium concentrations were documented to cause waterfowl deformities in the early 1980's. The Grasslands Bypass Project is a collaborative effort between state and federal agencies and Grassland Area Farmers which reduces selenium concentrations in the wetlands and San Joaquin River, sustains the productivity of 97,000 acres of farmland, and supports drainage management reduction of selenium and salt loading. Subsurface agricultural drainage water, high in selenium, has been removed from more than 93 miles of conveyance channels, allowing for delivery of fresh water to the wetland areas. Since 1996, the drainage water is conveyed instead through a segment of the San Luis Drain to Mud Slough, a tributary of the San Joaquin River. The reduction in selenium concentrations and loads demonstrates a successful, multi-agency collaborative process.

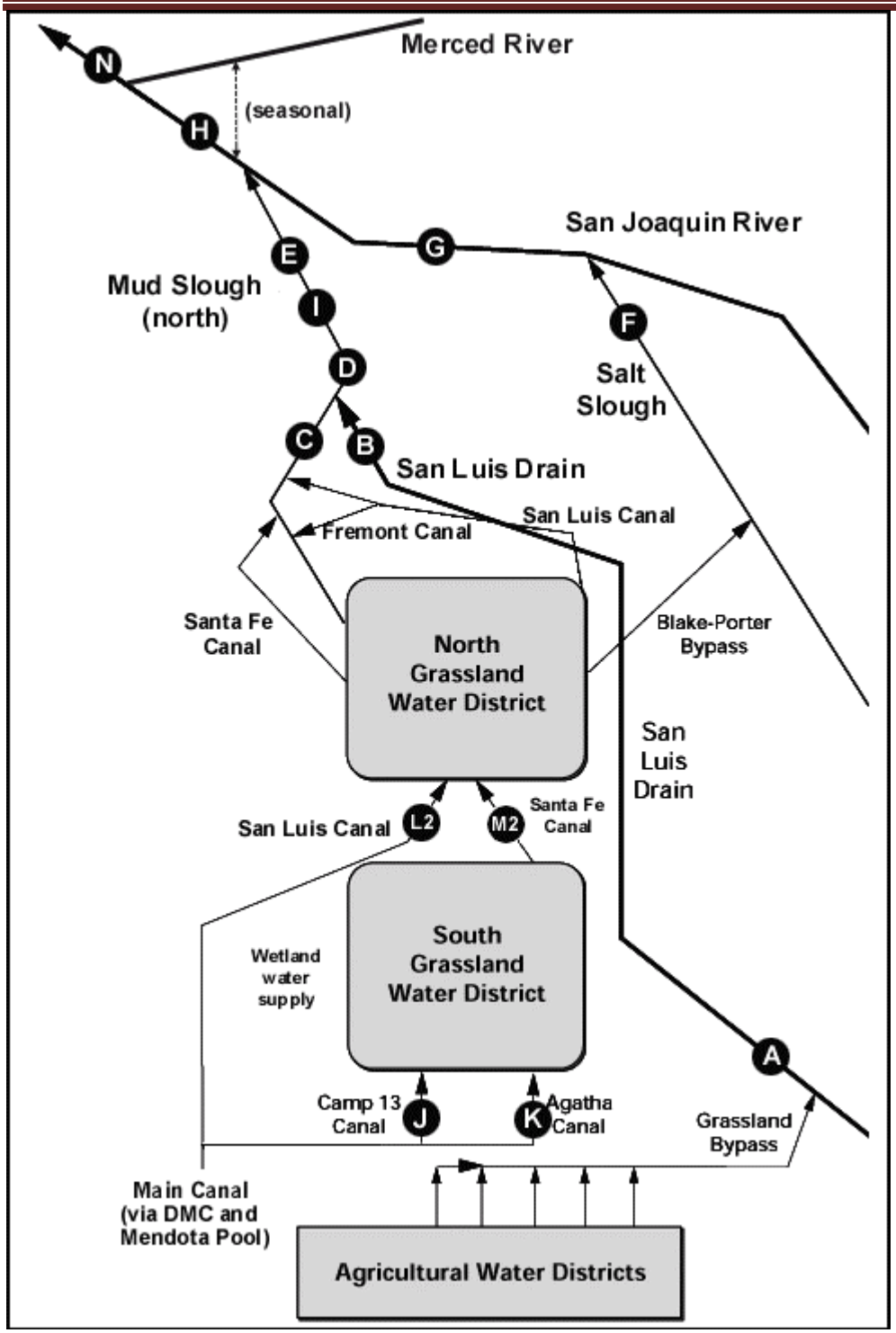
WHAT FACTORS INFLUENCE THE MEASURE?

Hydrology: Flows within the Grasslands Area are dominated by irrigation flows. Poorer quality (higher salinity) water is imported from the Delta for irrigation on the valley floor to replace water lost through diversion of the upper SJR flows.
Land Use: The extensive wetlands area in the Grassland Watershed provides habitat to over 30 species of waterfowl as well as several other wildlife. The main land use in the Grassland Area is irrigated agriculture.
Geology: Clay lenses throughout the Drainage Project Area cause a perched water table, bringing naturally elevated selenium groundwater into the root zone which must be drained to sustain agricultural productivity.
Water Year Type: A Water Year (WY) begins 1 October and ends 30 September of the following year. Since the inception of the project the Water Year type has varied with the last three years being critical or below normal years. Critical years provide less dilution flows, so although the overall loads may be lower, the actual concentrations may be higher in dryer years.

TECHNICAL CONSIDERATIONS:

"Central Valley Water Board SWAMP." *State Water Resources Control Board.* Web. 23 February 2010. <http://www.swrcb.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_ambient_monitoring/sjr_swamp.shtml>

"Grasslands Bypass Project." *United State Department of the Interior Bureau of Reclamation*. Web. 14 April 2010. <http://www.usbr.gov/mp/grassland/index.html>


Merced River
(seasonal)
N
H
San Joaquin River
G
E
Mud Slough
(north)
I
F
D
Salt
Slough
C
B
San Luis Drain
San Luis Canal
Fremont Canal
Santa Fe
Canal
North
Grassland
Water District
Blake-Porter
Bypass
San
Luis
Drain
San Luis Canal
L2
M2
Santa Fe
Canal
Wetland
water
supply
South
Grassland
Water District
A
Camp 13
Canal
J
K
Agatha
Canal
Grassland
Bypass
Main Canal
(via DMC and
Mendota Pool)
Agricultural Water Districts